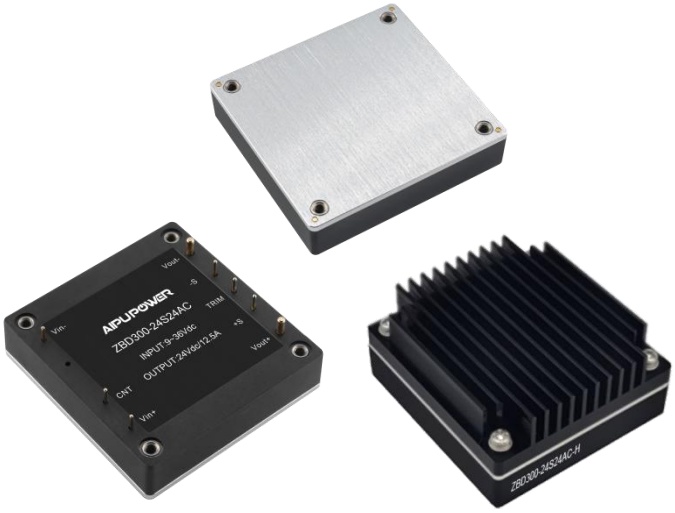


Typical Features

- ◆Wide input voltage range 4:1
- ◆High efficiency up to 91%
- ◆Low no-load power consumption
- ◆Operating Temperature: -40℃ to +105℃
- ◆High isolation voltage, input-to-output 1500VDC, input-to-case 1500VDC
- ◆ Input Undervoltage Protection (UVP); Output Over-current Protection (OCP), Overvoltage, Overtemperature, and Short-circuit Protection (SCP)
- ◆Standard 1/2 brick

The **ZBD300-24S24A** Series is a high-performance half-brick DC/DC power module. It provides a 300W regulated single output (24V) from a wide 9-36VDC input range. The series features no minimum load requirement, high isolation voltage, and an operating temperature of up to 105°C. Comprehensive protections include Input Under-Voltage (UVLO), Output Over-Current (OCP), Over-Voltage (OVP), Over-Temperature (OTP), and Short-Circuit Protection. Additional features include Remote Control (CNT), Remote Sense, and Output Voltage Trim.

Selection Guide

Part no	Input voltage range **(VDC)**	Output power **(W)**	Output voltage **(VDC)**	Output current **(A)**	Ripple & Noise **(mV)**	Full load efficiency(%) Min/Typ.	Note
ZBD300-24S24AC	**9-36**	**300**	**24**	**12.5**	**240**	**89/91**	**Standard Positive Logic**
ZBD300-24S24AN							**Standard Negative Logic**
ZBD300-24S24AC-H							**Heatsink Positive Logic**
ZBD300-24S24AN-H							**Heatsink Negative Logic**

Note: The output power derates linearly between 9-18VDC input; maximum output is 200W at 9VDC.

Input Specification

Item	Operating conditions	**Min.**	**Typ.**	**Max.**	Unit
Max input current	9V input voltage, output at full load	--	--	30	A
No load input current	Rated input voltage	--	--	50	mA
Input Transient Voltage (1 sec. max.)	Input exceeding this range may cause permanent damage	-0.7	--	60	VDC
Start up voltage		--	--	10	
Input under voltage protection(UVP)	No-load test, full-load test will have over current protection in advance	--	--	9	
Remote Control Pin (CNT)	Positive logic: CNT left floating or connected to 3.5-15V powers on; connected to 0-1.2V powers off				Reference voltage-VIN
	Negative Logic: CNT left floating or connected to 3.5-15V powers down; connected to 0-1.2V powers up				

Output Characteristics

Item	Working conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Nominal input voltage, 0%-100% load	--	±0.5	±1.0	%
Line Regulation	Full load, input voltage from low voltage to high voltage	--	±0.1	±0.2	
Load Regulation	Nominal input voltage, 10%-100% load	--	±0.2	±0.5	
Transient recovery time	25% Load Step Change (1A/50μs slew rate)	--	200	250	uS
Transient Response Deviation		-5	--	5	%
Temperature Drift Coefficient	Full load	-0.02	--	+0.02	%/℃
Ripple & Noise	20M bandwidth, external capacitor above 220uF	--	150	240	mVp-p
Output voltage adjustment（TRIM）		-10	--	+10	%
Output voltage remote compensation（Sense）		--	--	5	%
OTP	Case Operating Temp. (Max.)	105	115	125	℃
OVP		125	--	140	%
OCP		13.5	--	17.5	A
SCP		Hiccup, continuous, self-recovery			

General Specification

Item	Operating conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	I/P-O/P	Test 1min, leakage current < 3mA	1500	--	--	VDC
	I/P-Case	Test 1min, leakage current < 3mA	1500	--	--	VDC
	O/P-Case	Test 1min, leakage current < 3mA	500	--	--	VDC
Insulation resistance	I/P-O/P	Insulation voltage 500VDC	--	100	--	MΩ
Switching frequency			--	300	--	KHz
MTBF			150	--	--	K hours

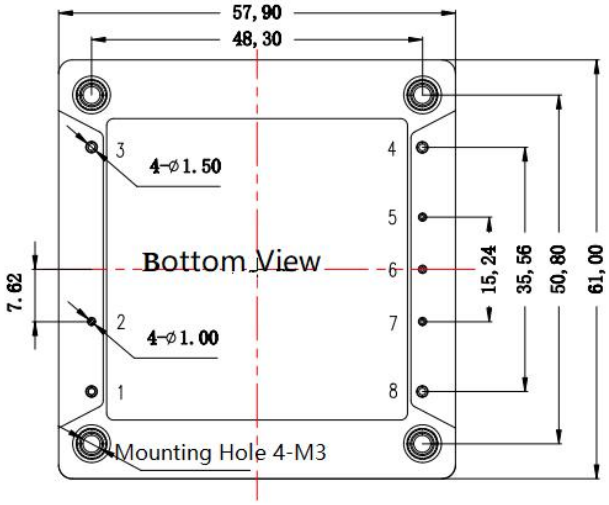
Environmental Characteristics

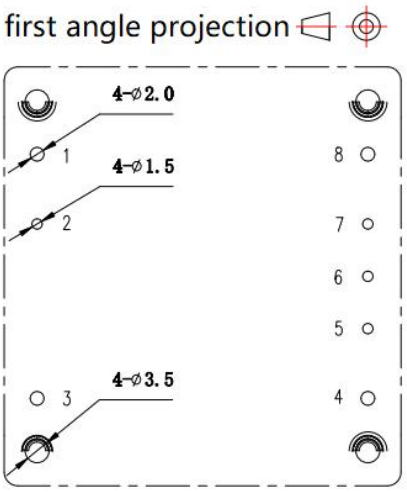
Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Derating Curve	-40	--	+105	℃
Storage Humidity	No condensing	5	--	95	%RH
Storage Temperature		-40	--	+125	℃
Lead Soldering Temperature	1.5mm from case, < 10s	--	--	+350	
Cooling requirements		EN60068-2-1			
Dry heat requirement		EN60068-2-2			
Damp heat requirement		EN60068-2-30			
Shock and vibration		IEC/EN 61373, Category 1, Class B			

EMC Performance				
EMI	CE	EN50121-3-2	150kHz-500kHz 79dBuV	
		EN55016-2-1	500kHz-30MHz 73dBuV	
	RE	EN50121-3-2	30MHz-230MHz 40dBuV/m at 10m	
		EN55016-2-1	230MHz-1GHz 47dBuV/m at 10m	
EMS	ESD	IEC/EN61000-4-2/GB/T 17626.2-2006	Contact ±6KV/Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3/GB/T 17626.3-2006	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4/GB/T 17626.4-2008	±2kV 5/50ns 5kHz	Perf. Criteria A
	Surge	IEC/EN61000-4-5/GB/T 17626.5-2008	line to line ± 1KV (42Ω, 0.5μF)	Perf. Criteria A
	CE	IEC/EN61000-4-6/GB/T 17626.6-2008	0.15MHz-80MHz 10 Vr.m.s	Perf. Criteria A

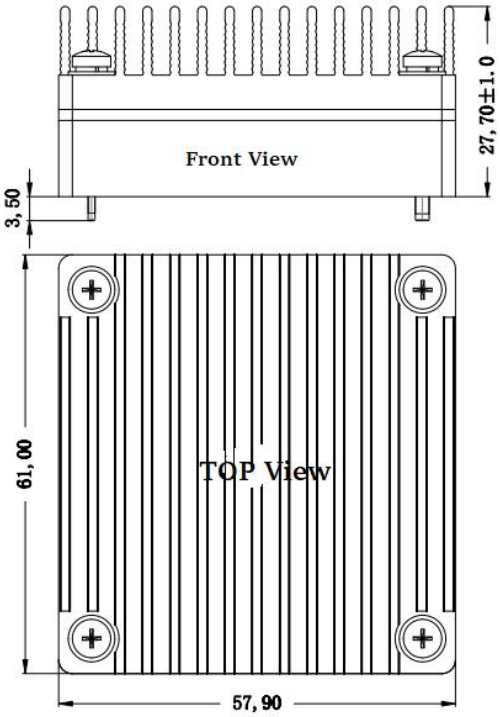
Physical Characteristics	
Case Materials	Metal base + black flame-retardant material housing (UL94-V0)
Heat sink	Dimension 61*57.9*15mm, weight 65g, aluminum alloy, anodized black
Cooling method	Conduction or forced air
Product Weight	Standard 120g, with heatsink 188g

Mechanical Dimensions & Pin Definition

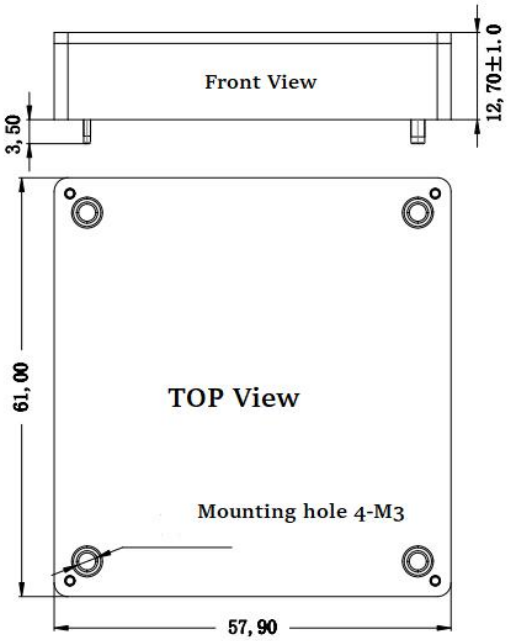




Recommended PCB Slot Size

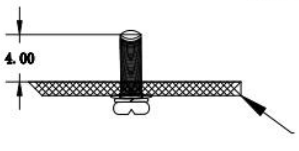


Standard+Heatsink
61*57. 9*27. 7mm



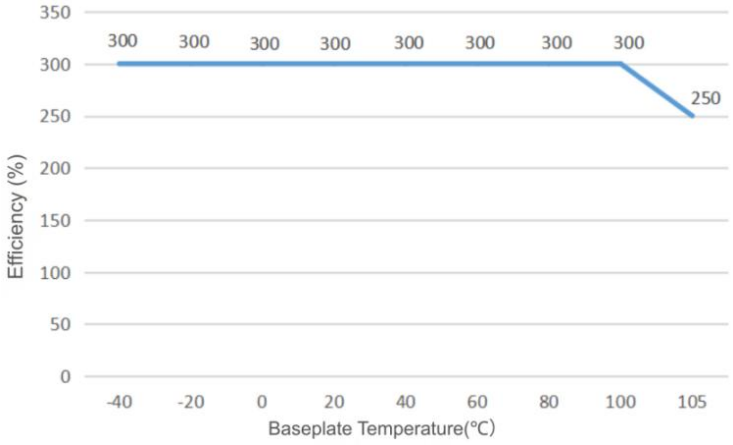
Standard
61*57. 9*12. 7mm

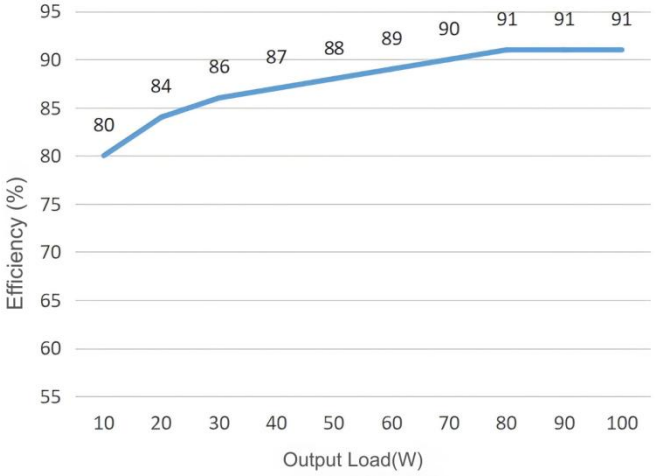
Note:
Unit:mm
Pin2, 5, 6, 7 dia:1.00
Pin1, 3, 4, 8 dia:1.50
General tolerance:±0.10
Mounting hole tightening torque:Max 0.4N*m

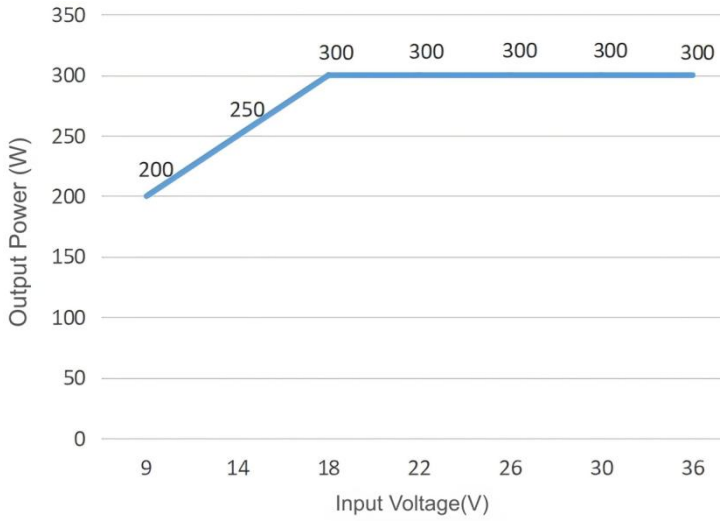


Pin No.	1	2	3	4	5	6	7	8
Pin Symbol	**Vin+**	**CNT**	**Vin-**	**Vout-**	**-S**	**TRIM**	**+S**	**Vout+**
Description	Positive Input	Remote Control	Negative Input	Negative Output	Remote Sense Negative	Output Voltage Trim	Remote Sense Positive	Positive Output

Product Characteristic Curves







Notes:

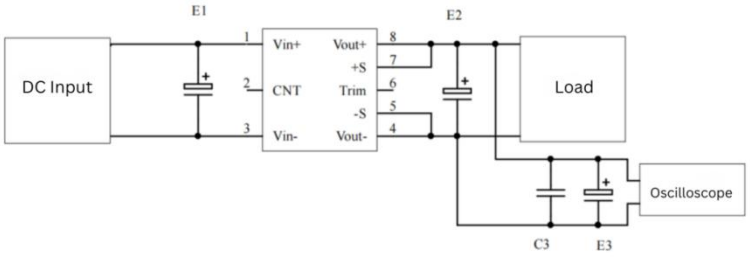
1.Both the thermal derating curves and efficiency curves are based on typical test values.

2.The thermal derating curves are obtained under our laboratory test conditions. If the actual application environment differs, please ensure that the aluminum case temperature of the product does not exceed 100°C. The product can be used within any rated load range as long as this temperature limit is maintained.

Design Reference

1.Ripple& Noise

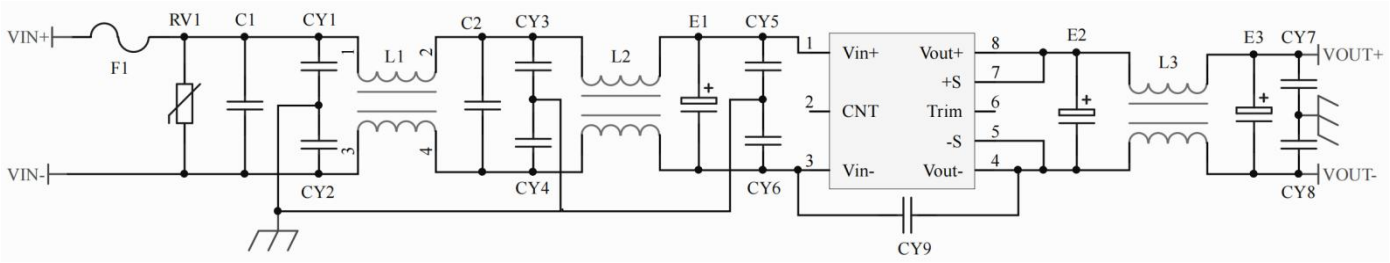
All DC/DC converters in this series are tested prior to shipment using the recommended test circuit shown below.



Output Volt \ Cap. Value	E1 (μF)	E2 (μF)	C1(μF)	E3 (μF)
3.3VDC	100	1000	1	10
5VDC		680		
12VDC		220		
.....				
48VDC				
.....	68	68		
110VDC				

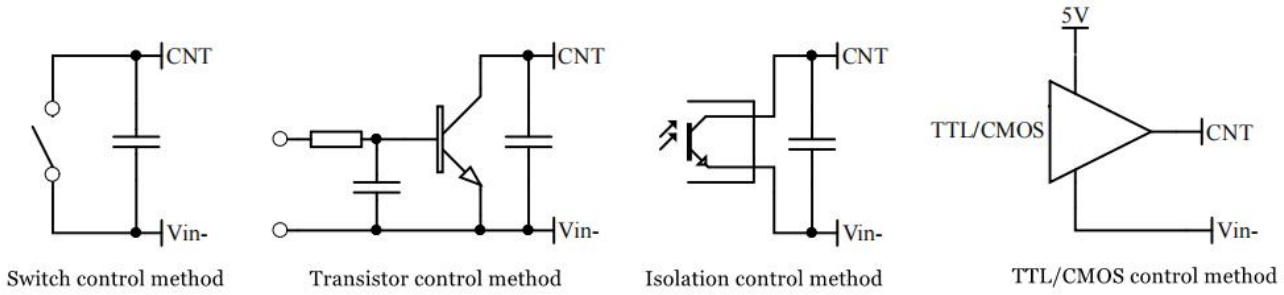
2. Recommended application circuit

If the customer does not use our recommended circuit, a minimum **100 μF** electrolytic capacitor must be connected in parallel at the input to suppress potential surge voltages.



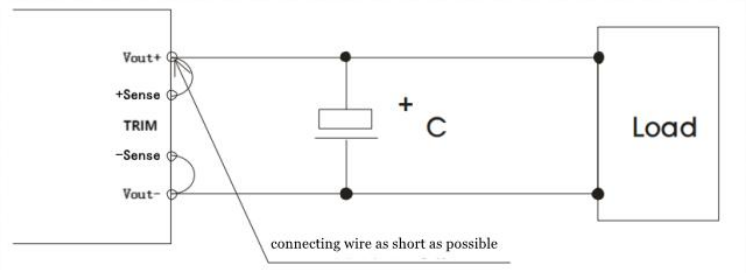
F1	T30A/250V fusing
RV1	14D 63V Varistor
C1,C2	105/100V Polyester Film Capacitor
CY1,CY2,CY3,CY4,CY5,CY6	102/250Vac safety Y2 capacitor
CY7,CY8	103/2KV Ceramic Capacitor
CY9	471/250Vac safety Y2 capacitor
E1	470μF/63V Electrolytic Capacitor
E2，E3	470μF/35V Electrolytic Capacitor
L1,L2	> 2mH; Temp. rise < 25° C @ 30A
L3	> 100μH; Temp. rise < 25° C @ 13A

3. Remote control terminal (CNT) control method application recommendation



4. Sense usage and precautions

（1）When not using Remost Sense

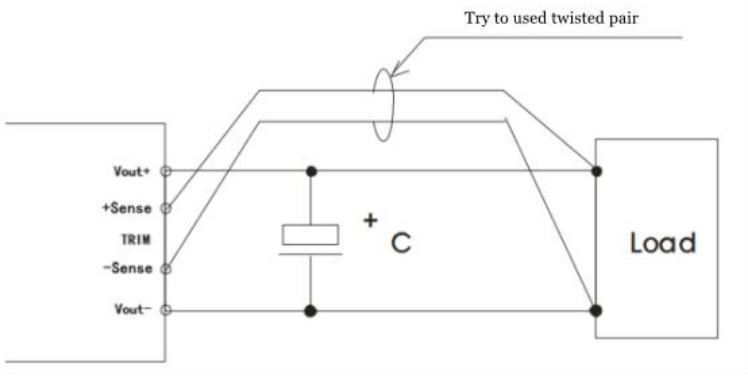


Precautions:

1.If Remote Sense is not used, **+Vout** must be shorted to **+Sense**, and **-Vout** to **-Sense**.

2.Keep the connections between **Vout** and **Sense** as short as possible and close to the pins to ensure module stability

(2) Using Remote Sense

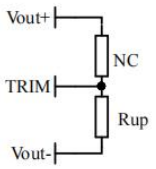


Precautions:

1. When the long-end compensation lead is used, the output voltage may be unstable;
2. If remote compensation is used, please use twisted pair or shielded wire, and keep the lead wire as short as possible;
3. Please use wide PCB leads or thick wires between the power module and the load, and keep the line voltage drop below 0.3V to ensure that the power output voltage remains within the specified range;
4. The impedance of the leads may cause the output voltage to oscillate or have larger ripples. Please verify it before use.

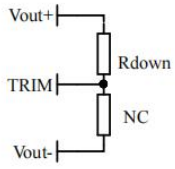
5. Use of TRIM and calculation of TRIM resistance

The relationship between output change voltage △U and resistance is as follows:



Voltage up regulation: add resistor Rup between Trim and output negative

Rup=50/△U-10 (KΩ)



Voltage Down: Add resistor Rdown between Trim and output positive

Rdown=20* (24-2.5-△U) /△U -10 (KΩ)

6. This product does not support the use of direct parallel connection to increase the power. If you need to use it in parallel, please consult our technical staff.

Others

1 The warranty period of this product is two years. During the normal damage, it will be repaired free of charge. Damages caused by errors in the use method or manufacturing technology, a paid service is provided.

2 Our company can provide product customization and matching filter modules. For details, please contact our technical staff directly.

Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: sales@aipu-elec.com Website: www.aipupower.com